SHOALS AND REEFS IN PONDEROSA PINE SILVICULTURE

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HAROLD WEAVER 1/

The early mariners along the coasts of our country had to sail uncharted seas. Our pioneer foresters, also, figuratively speaking, have had to sail seas largely uncharted. Almost overnight they had to prescribe silvicultural and protection policies for wild forests that had been moulded by nature's forces for countless centuries, or for forests or forest land badly abused by our civilization.

In the Ponderosa Pine Region, though forestry is still in the pioneering stage, enough time has elapsed to enable development of considerable navigational skill in steering the ship of forest management. Some of the shoals and reefs have been accurately charted. It is well known, for instance, that large areas have been so severely clear cut or burned that it will take a long time to return them to productive condition. The techniques of accomplishing such have received considerable attention and reclamation is proceeding, though slowly and expensively.

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Principal attention has been directed to harvesting of mature and over-mature stands of our virgin forests, to leaving adequate reserve stands, to protection of advance reproduction and to encouragement of subsequent reproduction following logging. Much thought and research have been devoted to the reserve stands, to the desirable type, age and vigor classes of trees to leave and to growth anticipated. Policies to be followed in selecting trees to cut or to leave have been debated; whether to be guided principally by economic or by more purely silvicultural considerations. Forest insects and diseases, together with susceptibility thereto of various age and vigor classes of trees, have been intensively studied. All of these have commanded considerable attention, as indicated, and doubtless will continue to, for much remains to be learned. They deal with some of the most urgent matters needing attention and will have influence principally on the harvest anticipated during the second cutting cycle.

What can be said concerning harvests anticipated during subsequent cutting cycles? Such harvests obviously must come largely from present sapling and pole stands. Despite many very hopeful aspects of the picture, this writer believes that the problems involved in protecting and developing these stands to harvesting time are far from simple. Indeed in the conditions and developments peculiar to these stands he sees some extremely dangerous shoals and reefs. In previous publications the writer has already discussed these in considerable detail. 5/ 7/, 9/, He believes, however, that it is appropriate that they be re-emphasized.

Uncharted Shoals and Reefs

It appears that though there is knowledge of some of these shoals and reefs, only a bare start has been made in charting them. By some foresters their

very presence is denied. Just what do the obstacles consist of, how do they threaten success of ponderosa pine silviculture and what, if anything, can be done about it? A start towards answering such questions can best be made by taking a close look at the reproduction sapling and pole stands now on the ground.

Over vast areas of the ponderosa pine region there have developed exceedingly dense sapling and pole stands of ponderosa pine reproduction. On superior sites excellent growth is occurring. On even more extensive areas, however, very poor growth is occurring because the stands are too dense and root competition between the trees is too intense. Meyer found in eastern Oregon and eastern Washington, for instance, that but a small fraction of the growth that should be anticipated was actually occurring in reproduction stands and concluded that if such stagnation is allowed to persist the cuts at the end of the second and subsequent cutting cycles will be imperiled. 4/ The writer, also, has described a study of growth conditions in a stagnating stand near Nespelem, Washington. 7/

It appears that the abnormally dense stands have developed partly because of our success, over large areas, in preventing recurrence of the periodic fires that used to sweep the ponderosa pine forests at frequent intervals. Overgrazing in the earlier days has also been of great significance in development of such stands, through breaking up of original sod cover and preparation of mineral seed beds. Such appears of particular significance in the Southwestern forests.

Over other vast areas associate species such as Douglas fir, white fir, and incense cedar are capturing the ground under the overstory of ponderosa pine. With the harvesting of the overstory, ponderosa pine will cease to exist as a type on such areas. Such development is entirely due to cessation of the periodic fires, for small trees of the presently invading species are very suscepti-

ble to killing by even light fires.

On large areas the overstory pines are apparently suffering severe competition from the dense sapling and pole stand of the understory and growth rate has declined 1/, even where precipitation and soil moisture conditions have recently improved. Such trees are easy prey to pine beetle attack and succumb easily to debilitating effects of disease. The writer believes this to be the principal reason why in certain areas the pine beetles are continuing epidemic attacks and why many of the reserve stands that should be making excellent growth are going to pieces.

As the dense reproduction stands develop, grass and other forage plants are crowded clear out of the picture. They simply can not exist in deep mats of needles under dense coniferous stands. Such has been of great significance in lessening carrying capacity of forests for domestic and game animals.

Since attempted total fire suppression has been initiated and the dense reproduction stands have developed the fire hazard has increased tremendously. The dense reproduction stands themselves are highly inflammable. The heavy needle mat that has accumulated, snag and windfall remains of numerous beetle or lightning killed trees and other accumulated debris add to the fuel. Where fires normally used to burn lightly over the ground through the light accumulation of fuel, they now are more apt to rage through the tree tops, killing everything. On extensive areas the already excessive fuel has been added to greatly by undisposed-of logging slash.

Where Do We Sail?

Where and how must the ship of forest management be sailed to avoid such shoals and reefs? Obviously most of these obstacles can be avoided or even removed if we are willing to spend enough money for really intensive practices.

The dense reproduction stands can be thinned by the axe or by other mechanical means and greater expenditures can be made for hazard reduction and for intensified protection. Such thinning can possibly be conducted with profit on more highly productive forest lands. Over the greatest portion of the Ponderosa Pine Region, however, it generally is the consensus of opinion that growth is so slow and productivity so low, even under most favorable conditions, that such intensive practice is uneconomic.

Technological improvements in forest utilization practices may in time considerably alter the picture and perhaps some day thinning of even small trees can be conducted on an economic basis. Perhaps, also, logging slashings may be utilized for by-products. It is quite possible that these wonderful things will come to pass, but the writer wonders if such intensive practice can be made to pay on any but the most productive forest lands.

In the meantime, what should be done? Should we wait for another great depression and another CCC and plan then on extensive thinning projects, or should we simply wait for the dominants to struggle above the mass of competing trees and attain gradual ascendancy? The previously mentioned study of growth conditions in a stagnated stand near Nespelem, Washington, disclosed that it took forty-two years for one of the largest dominants to grow to a diameter of approximately five inches d.o.b., at one foot above the ground. In contrast, in part of the same stand accidentally thinned by fire in earlier days, under similar site conditions, the average tree of the same age class was 7.4 inches d.o.b., while dominants were considerably larger. The largest found was approximately 16 inches d.o.b. and 55 feet in total height. How long can we afford to wait for such growth?

Should such associate species as Douglas fir, white fir and incense cedar be permitted to capture the ground to the almost total exclusion of ponderosa

pine? LeBarron has pointed out that on such sites ponderosa pine makes its most rapid growth. 3/

As silviculturists, should we insist on dense stands throughout the entire forest, or should we leave room for some grass and browse to grow and permit grazing of wild and domestic animals under proper supervision?

Shall we attempt reducing the hazard in the dense stands, or shall we ask for larger and ever larger protection budgets? In this era of staggering taxes and demands by taxpayers for Governmental economy, it is just possible that forestry budgets may be cut, instead of increased.

CONCLUSIONS

This writer believes that the shoals and reefs discussed herein are of such nature that they may some day severely damage or wreck the ship of forest management. He also believes, as previously indicated, that, though there is awareness of the obstacles, but a bare start has been made in charting them and in exploring corrective measures. Highly intensive silvicultural practices may provide the desired correction, but it appears that they are too expensive for application over the greatest portion of the Ponderosa Pine Region, because of slow growth and low productivity under even the most ideal conditions. Corrective measures, therefore, must be of such nature that they can be cheaply but effectively applied over wide areas.

In an effort to develop such method the writer has attempted tests of applicability of prescribed burning on the Colville Indian Reservation of north-central Washington. 6/, 8/, 9/ Preliminary results appear very promising. Results have also been observed and commented on by LeBarron, who has indicated that similar tests are now being conducted in ponderosa pine stands on the

Kootenai National Forest in Montana. 2/, 3/

It is the writer's sincere hope that increasing effort will be devoted towards solution of the problems herein discussed. In any event he believes it appropriate to raise the questions involved in this symposium on fundamentals of ponderosa pine silviculture.

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